

Medicolegal evaluation of hanging cases (Sanliurfa-Turkey)

Evaluation of hanging cases

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Abstract

Aim: Hanging is a common and highly lethal method of suicide worldwide. This study aims to describe the demographic, clinical, and outcome characteristics of hanging cases admitted to Şanlıurfa Harran University Hospital over 10 years.

Materials and methods: A retrospective review was conducted on 34 patients admitted between 2015 and 2024 due to hanging incidents. Data on age, sex, psychiatric history, Glasgow Coma Scale (GCS) at admission, materials used, and outcomes were analyzed.

Results: The mean age was 26.7 years, with 64.7% male patients. Suicide attempts accounted for 82.4% of cases. Half of the patients died either at admission or during hospitalization. A low GCS score (3–8) was strongly associated with mortality. Notably, 38.2% of cases were under 18 years old. Rope was the most frequently used material. Psychiatric history was documented in a minority of cases, and all surviving patients received psychiatric evaluation before discharge.

Discussion: Hanging remains a major public health concern due to its high mortality rate, particularly affecting younger populations. Early clinical assessment using GCS is critical for prognosis. Enhanced mental health support and prevention efforts targeting vulnerable populations are urgently needed. Larger studies are needed to better understand this issue and to help improve patient care.

Keywords

hanging, asphyxia, forensic medicine, suicide attempt

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Introduction

Suicide is a multifaceted global public health issue, with close to 800,000 deaths reported annually worldwide [1]. This type of behavior stems from a deeply complex and multifactorial process, shaped by the interplay of biological, psychological, social, cultural, historical, existential, religious, philosophical, and economic influences. This behavior is not limited to one specific group of people; it can affect a broad spectrum of individuals, ranging from those with serious mental health disorders to otherwise healthy people who face difficult life situations and stress [1,2]. These unexpected deaths, which most commonly occur among young and middle-aged adults, impose significant economic, social, and psychological burdens on individuals, families, and communities [1,3]. Hanging is among the most frequently employed methods of suicide in both developed and developing countries [1,3,4,5]. The preference for this method is influenced by factors such as easy access to ligatures, high lethality, availability of natural or artificial suspension points, and the common perception that hanging results in a painless, rapid, and bloodless death [6-8]. A study examining suicide trends in Türkiye over a 25-year period reported that hanging accounted for 47.5% of all suicides, making it the leading method across all age groups and both sexes [6]. Death due to hanging may result from venous and arterial obstruction, airway blockage, spinal cord injury, or reflex cardiac arrest caused by carotid artery compression due to the pressure exerted on the neck structures [9-11]. The hanging process is typically divided into two phases: an early phase characterized by dyspnea, convulsions, and apnea, and a late phase marked by cardiac arrest. The clinical outcome depends largely on the degree of hypoxic brain injury sustained. In mild cases, full recovery without neurological sequelae is possible, whereas in severe cases, patients may progress to a persistent vegetative state or death [9,10]. Hanging can be classified as either complete, where both feet are off the ground, or partial, in which one or both feet or other body parts maintain contact with a surface, such as kneeling, sitting, or lying positions [8,10,11]. Fractures of the neck structures primarily occur in blunt trauma cases such as hanging, with the hyoid bone and thyroid cartilage most frequently affected due to the ligature pressure, followed by the cricoid cartilage and posterior cervical vertebrae [7,8,10]. Hyoid bone fractures may involve any of its five anatomical segments or multiple segments simultaneously; however, in compression injuries caused by hanging, these fractures localize predominantly in the greater cornua [8,12]. This study presents a retrospective analysis of hanging cases admitted to Şanlıurfa Harran University Hospital over ten years. It aims to evaluate the demographic and clinical characteristics of the patients, including age and gender distribution, Glasgow Coma Scale (GCS) scores at admission, hospitalization duration, presence of psychiatric or substance use history, and mortality outcomes. Additionally, the study examines the materials used for hanging, the anatomical findings such as hyoid bone fractures, and the locations where the incidents occurred

Materials and Methods

Patient information such as age, gender, history of coexisting psychiatric conditions, the method employed in hanging, and length of hospital stay were retrieved from the Şanlıurfa Harran University Hospital's Hospital Information Management System (FONET). A retrospective review of hospital records spanning from 2015 to 2024 was conducted, during which cases involving hanging were identified and incorporated into the study. According to the admission history, cases presenting with hanging were divided into three groups: suicide attempts, accidents, and unknowns. At the time of hospital admission, patients were divided into 3 groups according to Glasgow Coma Score (GCS): GKS 3-8 (severe), GKS 9-12 (moderate), and GKS 13-15 (mild). **Statistical analysis** All statistical evaluations were performed using IBM SPSS Statistics for Windows, version 21.0 (IBM Corp., Armonk, NY, USA). Continuous variables were summarized as means with standard deviations (SD), while categorical variables were expressed as frequencies and percentages. For contingency table analyses involving cell counts greater than five, the Chi-square test was applied. In cases where the expected cell count was below five, Fisher's Exact Test was utilized to assess associations between categorical variables. A p-value less than 0.05 was considered statistically significant throughout the analyses. **Ethical approval** This study was approved by the Ethics Committee of the Clinical Research Ethics Committee of Harran University Rectorate (Date: 2024-11-18, No: E-76244175-050.04-393108). **Results** Between 2015 and 2024, a total of 34 patients presented to our hospital due to hanging. Among these patients, 22 (64.7%) were male with a mean age of 26.7 ± 14.23 years (range: 3–68 years), and 12 (35.3%) were female with a mean age of 27.08 ± 22.01 years (range: 14–86 years). When the cases presenting with a history of hanging were analyzed according to age groups, 38.2% (n=13) were under 18 years of age, 44.1% (n=15) were between 18 and 35 years, 8.8% (n=3) were between 36 and 50 years, and 8.8% (n=3) were over 50 years. The highest incidence of presentations was observed in the 18–35 age group, followed by the pediatric group under 18 years. Individuals in the young adult and pediatric age groups constituted 82.3% of all cases. Notably, the adolescent group (defined as ages 12–18) accounted for 38.2% (n=13) of cases, indicating a conspicuously high number within this age range. Additionally, one case (2.9%) involved a 3-year-old child in the early pediatric age group, which was considered a subgroup requiring special attention. At the time of hospital admission, traumatic lesions in regions other than the neck were detected in four cases. Among the hanging cases analyzed, 82.4% (n=28) were classified as suicide attempts, 5.9% (n=2) as accidental, and 11.8% (n=4) as cases with undetermined cause. The average length of stay in the intensive care unit was

Table 1. Demographic and clinical characteristics of hanging incidents

Parameters					
Age Groups Gender	0-18 n	18-35 n	36-50 n	>50 n	Total
Males	7	11	3	1	22 (%64,7)
Females	6	4	0	2	12 (%35,3)
Total	13 (-38,20%)	15 (-44,10%)	3 (-8,80%)	3 (-8,80%)	34 (-100%)
Origin	0-18	18-35	36-50	>50	Total
Suicide attempt	10	12	3	3	28 (%82,4)
accidental	1	1	0	0	2 (%5,9)
Unknown	2	2	0	0	4 (%11,8)
Total	13 (-38,20%)	15 (-44,10%)	3 (-8,80%)	3 (-8,80%)	34 (-100%)
Material used in hanging	0-18	18-35	36-50	>50	Total
Rope	6	2	0	0	8 (%23,5)
Sheet	1	0	0	0	1 (%2,9)
Unknow	6	13	3	3	25 (%73,6)
Total	13 (-38,20%)	15 (-44,10%)	3 (-8,80%)	3 (-8,80%)	34 (-100%)
Glasgow Coma Scale (GCS)	0-18	18-35	36-50	>50	Total
GCS (3–8)	8	12	3	3	26 (%76,5)
GCS (9–12)	2	1	0	0	3 (%8,8)
GCS (13–15)	3	2	0	0	5 (%14,7)
Total	13 (-38,20%)	15 (-44,10%)	3 (-8,80%)	3 (-8,80%)	34 (-100%)
Places where the hanging occurred	0-18	18-35	36-50	>50	Total
Enclosed spaces	3	6	0	0	9 (%26,5)
Open spaces	4	5	0	0	9 (%26,5)
Unknown	6	4	3	3	16 (%47,0)
Total	13 (-38,20%)	15 (-44,10%)	3 (-8,80%)	3 (-8,80%)	34 (-100%)
Discharge Status	0-18	18-35	36-50	>50	Total
exitus	6	6	3	2	17 (%50,0)
healthy discharge	7	9	0	1	17 (%50,0)
Total	13 (-38,20%)	15 (-44,10%)	3 (-8,80%)	3 (-8,80%)	34 (-100%)

17.97 ± 48.3 days, ranging from 1 to 234 days. Psychiatric history was present in three cases, substance abuse history in three cases, and non-psychiatric (somatic) medical history in two cases. It was noted that psychiatric consultations were requested for all 17 cases discharged in a healthy condition during their hospital stay. Upon initial hospital admission, patients were categorized according to the Glasgow Coma Scale (GCS) into three groups: severe (GCS 3–8), moderate (GCS 9–12), and mild (GCS 13–15). At admission, 26 patients were classified as severe, 3 as moderate, and 5 as mild. Overall, 50% of the patients (n=17) died either at the time of admission or during hospitalization. Among those who died, 16 had an initial GCS score between 3 and 8, while only one patient had a GCS score between 9 and 12. Regarding the locations where the hanging incidents occurred, 9 cases (26,5%) took place in enclosed spaces (home, dormitory, prison), 9 cases (26,5%) in open spaces, and for 16 cases (47,0%), information on the location was unavailable. In terms of hanging materials, 8 cases (23,5%) involved the use of rope, and 1 case (2,9%) involved the use of a sheet. Data on hanging materials were not available for the remaining 25

cases. Statistical significance was observed between GCS values and mortality (p=0.035). However, the comparisons among the remaining groups did not yield statistically significant results.

Discussion

Globally, for every suicide death among women, approximately two suicide deaths are reported among men. Although suicide attempts are 2 to 4 times more frequent in women compared to men, the higher lethality of methods preferred by men partially explains this reversed mortality ratio [1]. In Turkey, over the past decade, the rate of male suicides by hanging has been 2 to 4 times higher than that of females. According to data from the Turkish Statistical Institute, hanging has been the most common suicide method between 2000 and 2023. In 2023 alone, 79,4% of deaths by hanging were male. During the same period, the highest suicide rates were observed in the 25–29 age group [3]. In our study, the mean age of 34 patients was 26.82 ± 14.23 years, and 64,7% (n=22) were male. These figures are consistent with the study by Lapo-Talledo et al. [13] in Ecuador, where the mean age was 34.15 ± 18.42 years and 79,5% of cases were male. In a study conducted in the United

States by Choi et al. [4], hanging was most common among males aged 25–44 and females aged 18–24, with 78,3% of the cases being male. Gökçek et al. [14] reported that 84,2% of the cases in their Turkish study were male, with a median age of 31. These findings indicate that the male predominance and age distribution observed in our study align with both national and international literature.

The association between suicide and psychiatric disorders—particularly depression and substance use disorders—is well-documented, especially in high-income countries [1,15]. Factors such as young age, unemployment and economic hardship, a family history of suicide, previous suicide attempts, psychiatric illnesses, substance abuse, hopelessness, social isolation, limited access to treatment, and availability of lethal means increase the risk of suicide [16]. In our study, 6 cases (17.7%) had a documented history of psychiatric disorder and/or substance use. In the study by Choi et al. [4], 61.7% of 26,879 hanging/strangulation cases had a psychiatric disorder or substance misuse. The lower rates in our study may be attributed to data limitations, mental health stigma, and lower rates of psychiatric consultation due to sociocultural factors.

Mortality rates in hanging cases vary between 69% and 84% in the literature [5,11,17]. In our study, 76,5% (n=26) of the 34 patients presented with a Glasgow Coma Scale (GCS) score <8, and 50% (n=17) died either at presentation or during hospitalization. In the study by Ribaute et al. [18], the rate of GCS <8 was 40,1%, and the mortality rate was 21%. In a study by Jawaid et al. [19] involving 101 patients, the GCS <8 rate was 55,4%, with a mortality rate of 5,9%. In Berke et al.'s [16] study, 19,4% of patients with a GCS <8 died, with most of these patients having a GCS of 3. In the study by Biswas et al. [20], the GCS <8 rate was 36%, and the mortality rate was 24%. These findings confirm the high mortality commonly observed in hanging cases, especially among individuals with a GCS <8, supporting the conclusion that GCS is a critical predictor of mortality.

In hanging suicide attempts, indoor environments are most frequently chosen, likely due to privacy and easy access to binding materials [21]. In our study, 26,5% (n=9) of incidents occurred indoors, another 26,5% occurred in open areas, and location data were unavailable for 47,06% of cases. In a study from Turkey by Özer et al. [7], 60,4% occurred at home and 18,7% in open areas. In the U.S.-based study by Choi et al. [4], 71,3% of cases occurred at home. The relatively low percentage of indoor cases in our study may be attributed to the high rate of missing location data (47,0%).

Ropes and clothing items are the most commonly used materials in hanging suicide attempts [22]. In our study, the use of rope was found in 23,5% (n=8) of cases, and sheet use in 2,9% (n=1). Akber et al. showed that common ligature materials in hanging suicides include fabrics (45.6%), jute ropes (33.7%), and nylon ropes (20.7%) [23]. In the study by Shabnam et al. [24], 41,9% of ligature materials were ropes and 5,6% were nylon ropes. Özer et al. [7] reported that 62,5% were nylon ropes and 12,5% were sheets, while Chacko et al. [8] found that 46,3% were nylon ropes. These findings are consistent with our study and support

the notion that rope use is a universal preference in hanging attempts.

In hanging cases, fracture of the hyoid bone is a significant forensic finding [7,25]. In our study, a hyoid bone fracture was observed in only one case (2.94%), which falls within the range of 0–83.3% reported in the literature [7,25]. Our findings are consistent with those of Roy et al. [12].

Limitation

A primary constraint of this study was the small patient cohort available for analysis. The small number of cases limited the statistical power of the study, preventing meaningful significance in the data distribution. An additional shortcoming of the study was the observation that in suicide cases involving hanging, most individuals are typically found deceased at the scene, which results in a low number of hospital admissions and limits the availability of detailed clinical information. Lastly, since the research was carried out at a single tertiary care center located in southeastern Turkey, approximately 18 kilometers from urban residential zones, broader multicenter studies are necessary to obtain more generalizable findings that accurately represent nationwide trends.

Conclusion

This study examined 34 hanging cases treated at Şanlıurfa Harran University Hospital over 10 years. Most patients were young adults, with a mean age of 26.7 years, and men made up nearly two-thirds of the cases. The majority (82.4%) were suicide attempts, and half of the patients died either at admission or during treatment. A low Glasgow Coma Scale (GCS) score (3–8) at admission was strongly linked to higher mortality. Notably, a significant number of cases (38.2%) were under 18 years old, highlighting the vulnerability of younger individuals.

Rope was the most commonly used material in hanging attempts, while fractures of neck structures were rare. Although few patients had recorded psychiatric or substance use histories, all survivors received psychiatric evaluation before discharge. These findings highlight hanging as a serious public health problem with high fatality rates, especially among young people. Improved mental health services and prevention strategies are urgently needed. Larger studies are recommended to better understand hanging cases and improve patient outcomes.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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